



REMARKS

This is in response to the Official Action of August 5, 2008. Entry of the amendment and favorable action is respectfully requested.

A petition for a one-month extension of time to respond to the Office Action is enclosed, and also enclosed is a Request for Continued Examination.

Replacement formal drawings are sent herewith, which are believed to correspond fully with the originally filed drawings. The errors in the formal drawings submitted with the last Amendment are regretted.

Applicant is submitting new claim 28, in addition to amending independent claim 22. Claims 2-6 have been changed to depend from new claim 28.

By way of background, claim 28 and 2-6 are directed to a vaporization system similar to but more in detail than original independent claim 1 and its dependent claims. A response will be made to the rejections that were related to original claim 1, as well as responding to the rejections of claims 22-27 and 12, which were rejected in the Office Action of August 5, 2008.

Claims 12 and 26 were rejected under 35 USC § 112, and it is believed that the antecedent basis for the outlet in the housing is now made in claim 22, the parent claim, so that this rejection has been overcome.

Claims 12 and 22-27 were rejected to as being unpatentable over the Yoshioka publication 2002/00432215 (U.S. Patent No. 7,163,197) in view of the Dornfest et al., U.S. Patent No. 6,082,714. The Examiner stated that Yoshioka disclosed a vaporization system including a vaporization chamber receiving an aerosol from an atomizer, with the aerosol comprising gas and liquid droplets from first and second respective gas and liquid sources, and at least one of the sources comprise a plurality of different individually selected material. It was stated that Dornfest, in Figure 15, disclosed a vaporization system analogous to that of Yoshioka and taught the use of heated metal block, with passageways formed between the fins 178, that there was a bore aligned with the inlet of the vaporization chamber.

However, it is respectfully submitted that the teaching of Dornfest does not provide any suggestion at all of the structural arrangement of the vaporization chamber described in claim 22, as amended, which particularly points out the structure of the heated metal block that provides a number of passageways with heated surfaces and also recirculation of the aerosol through the passageways that are separate from the center bore. In particular, features of claim 22 now include a housing with the metal block spaced from a first wall of the housing and the metal block having passageways therethrough and “a separate bore through the first metal block, the separate bore being substantially parallel to and of larger cross section than each individual passageway” with the separate bore being aligned with the inlet. There is an orifice positioned to create a negative pressure “in a space between the first wall and the first metal block such that aerosol discharged from the bore at an end remote from the space is drawn into the space through the plurality of individual passageways and recirculated through the separate bore”. In Dornfest, Figure 15, there is an ejection nozzle 170 that discharges into a bore, that leads to the fins 178. The material is directed through the spaces between these fins only, in that there is a cup wall 176 that blocks any flow from the passageway 174 below the nozzle 170 except through the fins 178 that form a path for flow into the exit ports 182. There is no recirculation of materials. It is pointed out that in Figure 15 of Dornfest et al., numeral 176 defines a cup-shaped portion which blocks outgoing flow except through the fins. Notches are provided and indicated at 180 to trap liquid. The passageway or bore 174 does provide for one or more carrier gases, but there is no teaching or indication of having a heated block that has a plurality of passageways through the block, with a separate bore that is parallel to the passageways and aligned with the inlet to carry the incoming aerosol flow in a manner that creates a vacuum or negative pressure in a space between the first wall of a housing and the metal block for the recirculation of the aerosol.

The references do not have any suggestion or showing of this arrangement, and there isn't any indication that the negative pressure induced recirculation is suggested or even desired in the references provided. In fact, the Dornfest fins form a passageway specifically to provide surfaces for vaporization and heat transfer, and there is a flow only through the

passageways formed by the fins and out through the ports 182. Outlet 184 is directly connected to the ports 182 and there is not any recirculation that is possible.

Claim 25 included the recirculation recitation in general terms, and the Examiner indicated that recirculation was inherent, at least in some degree, in the chamber of Dornfest. However, that is believed to be incorrect when a review of the Dornfest operation is made, in that the pressure from the ejection nozzle 170 and the carrier gas in passageway 170 is used to force the flow through the path created by the fins, and then directly out through the ports 182 and the outlet 184 of Dornfest, with no possibility of recirculation. Pressure differential between the incoming aerosol and the low pressure at the outlet 184 and ports 182 prevent reverse flow.

Therefore, it is respectfully submitted that claim 22 defines in a non-obvious manner over the combination of cited references.

Claims 2-6 (which no longer depend from claim 22), 12 and 22-27 were also rejected as being unpatentable over the Yoshioka publication in view of the Dornfest patent and further in view of International Publication to Yamamoto WO 03/079421, and Yamamoto EP Publication 1492159.

It is respectfully believed that this combination rejection is overcome for the reasons set forth above, because of the lack of the teaching of the structure of claim 22 relating to the plurality of passageways through the heated metal block, which block is spaced from a wall of the housing to form a space in which a negative pressure is created to provide for the aerosol recirculation.

Claim 22 has structural features in addition to having a plurality of gas sources or liquid sources for showing non-obviousness. The inlet and the orifice are specifically claimed, and the arrangement of the orifice, with the spacing of the metal block from the inlet in the first wall of the housing for the creation of a negative pressure, causes the recirculation effect for vaporizing the liquid droplets in the aerosol. Thus, the addition of the Yamamoto publication or European patent does not, in any way, affect the allowability of claim 22 and its dependent claims.

Again, the Examiner's comments regarding claim 25 in this rejection including the Yamamoto reference, was that claim 25 recited a velocity of the gas causing a recirculation, and that that recitation was a process parameter. Claim 22 includes the structural arrangement of the spacing, with the orifice in place to create a negative pressure in the space between the first wall of the housing and the metal block this structurally defines the arrangement for obtaining recirculation, it is respectfully submitted.

It is further asserted that while Dornfest teaches spaced fin passageways designed to create twists and turns to mix the precursor combination and carrier gas the use of a one way passage does not suggest reducing the pressure in a specific space on the inlet side of the heated block to cause recirculation. It is respectfully believed that there is no possible circulation in the Dornfest fin passageways under the existing laws of physics in that the pressure differential from the bore 174 and the injector 170 relative to the outlet is continuous, and that recirculation could not occur because of this pressure differential. Nonlaminar flow causing eddy currents cannot recirculate when the pressure differential maintains such flow through the passageways. Whether or not there is turbulent flow is another matter, but that is not the same as recirculation through passageways that are specifically provided for increasing the heated surfaces through which the aerosol flows, as claimed in claim 22.

Claim 26 is believed to be allowable with claim 22 in that the second metal block also has a plurality of passageways therethrough, and there is no second metal block as such in the Dornfest device. It is one single block that contains the passageways formed by the fins, and there is no second metal block that has passageways for transferring heat to the aerosol. Stated another way, it is respectfully asserted there is no first metal block in Dornfest that has a plurality of passageways and a separate bore through which material flows, and then a second metal block with a plurality of passageways for carrying the aerosol.

Claim 27 is believed to be allowable in contrast to the Examiner's statement that the second metal block is 186 in Dornfest. There is no first metal block in Dornfest that has the passageways that are defined in claim 22, if block 186 is considered the second metal block. Block 186 is aligned with the end of the bore 174. If block 186 is to be called the second metal

block, the first metal block would have to be 188 in Figure 15 of Dornfest and block 188 does not have a plurality of passageways nor any type of recirculation back to a space between the housing and the metal block.

Thus, it is respectfully submitted that claim 27 is clearly allowable. Claim 12 is believed allowable with claim 22.

Considering claim 28 as being similar to claim 1, originally presented, claims of this type were rejected first as being anticipated by Yamamoto, considering Yamamoto EP 1492159 as being equivalent to its earlier publication.

However, new claim 28 in particular has been restructured to define a vaporization system for vaporizing material carried in a gas stream that includes an outer housing defining a vaporization chamber, with a heated surface member in the vaporization chamber, and an atomizer that comprises a passageway open to the vaporization chamber and having a plurality of separate liquid inlets and a gas inlet. There are a plurality of sources of different liquids, each source being connected to a separate one of the liquid inlets, separately controllable to provide a flow of liquid precursor to each of the liquid inlets. The liquid and gas mixtures are then introduced into the vaporization chamber for vaporization by heat from the heated surface member. In rejecting claim 1, reference was specifically made to Figure 21 of Yamamoto, which shows atomizer and vaporizer sections from Figures 19 and 20.

The teaching in Yamamoto is that there are simultaneous introductions of liquids into an atomizing section and two different mixing sections. It is respectfully submitted that in claim 28, a passageway carrying a gas stream provided with two inlets that are selectively controllable so that the individual liquids can be provided to the passageway with only one aerosol forming section prior to introduction into a vaporization chamber.

It also can be seen in the Yamamoto reference, including the description of Figure 19, that there is heating in the atomizing section, because cooling water is necessary through inlet "C". A raw material source shown at "B" is in the first mixing section with the second carrier gas or second carrier introduced at "E" for a second mixing and atomizing section. The distinguishing phrases in new claim 28 include the passageway for the atomizer with gas flowing

through it, and to a plurality of liquid sources that are individually controllable for introduction into the single passageway.

It is believed that claim 28 and its dependent claims are allowable.

Claims, such as claim 1, (and now 28) were also rejected as anticipated by, or in the alternative, obvious over the Yoshioka patent 7,163,197. Figures 44, 45 and 46 of Yoshioka were referred to, but it is respectfully submitted that Yoshioka does not show a passageway forming an atomizer with a gas inlet and plural liquid sources (3 as shown) in the present disclosure that are directly connected to the passageway and which form an atomizer for selectively controllable liquid sources from at least two liquid sources of FIG. 44.

Yoshioka shows separate atomizers in the head, not a passageway as claimed in claim 28 with a gas inlet and a plurality of liquid sources.

Regarding the rejection of the claims as being unpatentable over Yoshioka '197 in view of the Yamamoto publication, claim 28 specifies that there are plural liquid sources introduced into a passageway for introduction into the heated vaporization chamber. It is respectfully submitted that this is not illustrated or suggested in either one of the Yamamoto or Yoshioka patents as claimed.

It is thus believed that claim 28 and its dependent claims are allowable.

Regarding the Pazde Araujo patent 6,511,718, present claim 28 defines over this reference by having a passageway that has a source of gas, flowing through a passageway with a plurality of liquid sources directly connected to the passageway for atomization. The '718 patent shows liquid sources, different gas sources, but the concept is to provide for a mist that is formed from each of the individual liquid sources by separate gas inlets, not by providing a passageway that has a carrier gas flowing through it with a plurality of controllable liquid sources leading to the passageway and then introduction into a vaporization chamber. Thus, it is believed that claim 28 and its dependent claims define over the '718 patent.

In regard to the rejection of certain claims over the Sun patent, 6,409,839, one reagent liquid and a solvent are in a common input line so that they could be mixed together. However, there is no showing of separate selectable liquid sources connected to the passageway

through which the gas is flowing. Thus, it is believed claim 28 defines over this arrangement as well, because there are a plurality of distinct liquid sources claimed. Again, the provision of separately controlled liquid sources and reagents is not shown or suggested in the Sun patent.

Therefore, favorable action is respectfully requested on claims 28 and 2-6, which depend therefrom, as well as claim 22 and its dependent claims.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

WESTMAN, CHAMPLIN & KELLY, P.A.

By: NICKOLAS E. WESTMAN/  
Nicholas E. Westman, Reg. No. 20,147  
900 Second Avenue South, Suite 1400  
Minneapolis, Minnesota 55402-3244  
Phone: (612) 334-3222 Fax: (612) 334-3312

NEW/mek